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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,114	07/21/2003	Louis Andrew Schick	130754-1	6131
6147	7590	05/10/2006	EXAMINER	
GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 NISKAYUNA, NY 12309			KIM, TAE JUN	
			ART UNIT	PAPER NUMBER
			3746	

DATE MAILED: 05/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/624,114

Applicant(s)

SCHICK ET AL.

Examiner

Ted Kim

Art Unit

3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20, 22, 23, 25-37, 39 is/are rejected.
- 7) ☒ Claim(s) 21, 24 and 38 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/2005 07/2003</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5, 17-20, 22, 23 are rejected under 35 U.S.C. 102(b) or 102(e) as being anticipated by Chandran et al (6,548,197) or the equivalent WO 01/12755 (all citations are from the US reference). Chandran '197 teaches a power system comprising: a fuel cell module 38 adapted to receive a first fuel (col. 8, lines 40+); and a pulse detonation combustor 12 (col. 15, lines 27+) adapted to receive and detonate a second fuel (col. 15, lines 20+) and exhaust a plurality of detonation products; wherein said fuel cell module is further adapted to receive a first oxidizer (e.g. air, see Fig. 8, middle of right hand side delivered to the PAFC), and wherein said pulse detonation combustor is further adapted to receive a second oxidizer; wherein the first and second fuels are different or same fuels (col. 8, lines 40+; col. 27+ being gaseous fuels covers all instances of fuels which could be the same or different); wherein the second fuel comprises the first fuel plus a tail gas (see Fig. 8 and e.g. col. 17, lines 62+) from said fuel cell module; wherein said fuel cell

module comprises at least one fuel cell stack comprising at least one fuel cell unit; further comprising a reformer 34 adapted to receive and reform a fuel and to generate a reformat, wherein the first fuel comprises the reformat (col. 8, lines 30+); wherein the second fuel also comprises the reformat (col. 8, lines 30+); wherein the second fuel further comprises a tail gas from said fuel cell module; wherein said pulse detonation combustor is capable of operating in a stand-alone mode, and wherein said reformer is adapted to supply the reformat to said pulse detonation combustor which is capable of operation in the stand-alone mode.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-20, 22, 23, 25-37, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Viteri et al (2002/0174659) in view of any of Chandran et al (6,548,197 or the equivalent WO 01/12755, all citations are from the US reference) and/or Bussing (6,062,018). Viteri et al teach a power system comprising: a fuel cell module 50 adapted to receive a first fuel (CH₄); and a combustor 60 adapted to receive and combust a second fuel (CH₄ or tail gases from 50) and exhaust a plurality of combustion products; wherein said fuel cell module is further adapted to receive a first

oxidizer from 40 and wherein said combustor is further adapted to receive a second oxidizer (O₂ with the fuel cell tail gases); wherein the first and second fuels are different/same (or the reformer tail gas/CH₄) fuels; wherein the second fuel comprises the first fuel CH₄ plus a tail gas 20 from said fuel cell module; a compressor 40 configured to supply compressed air (page 2, paragraph 0013) to at least one of said fuel cell module and said combustor; wherein both the first and the second oxidizers comprise oxygen enriched compressed air; said combustor is further adapted to receive a supplemental oxidizer from 22 (col. 3, lines 19+) which comprises oxygen; wherein said fuel cell module; further comprising a turbine 70 positioned downstream from said pulse detonation combustor, said turbine 70 being in flow communication with said combustor; a generator 80 connected to said turbine, said generator 80 being adapted to generate electricity; a steam turbine assembly 150 adapted to receive an exhaust stream from said turbine, to generate steam 130 using the exhaust stream from 70, and to generate power using the steam; wherein said steam turbine assembly comprises: a steam turbine adapted to generate power using the steam; a condenser adapted to receive and condense an exhaust steam from said steam turbine to supply a fluid stream; and a pump adapted to receive and pump the fluid stream; said steam turbine assembly further comprises a heat recovery steam generator 130 adapted to receive the exhaust stream from said turbine, to receive the fluid flow from said pump, and to generate steam from the fluid flow using the exhaust stream; further comprising a reformer (see Fig. 1, top left) adapted to receive and reform a fuel and to generate a reformat, wherein the first fuel comprises the

reformate; wherein the second fuel further comprises a tail gas from said fuel cell module; wherein said combustor is capable of operating in a stand-alone mode, and wherein said reformer is adapted to supply the reformate to said combustor for operation in the stand-alone mode; wherein said combustor is capable of operating in a stand-alone mode; wherein said fuel cell module is adapted to operate in a stand-alone mode. A power system comprising: a fuel cell module 50 adapted to receive a first fuel; a combustor 60 adapted to receive and detonate a second fuel and exhaust a plurality of detonation products; a turbine 70 positioned downstream from said combustor, said turbine 70 being in flow communication with said combustor; and a compressor 40 configured to supply compressed air to at least one of said fuel cell module 50 and said combustor 60; further comprising a generator connected to said turbine and adapted to generate electricity; wherein said combustor is capable of operating in a stand-alone mode; further comprising a reformer (see top left of Fig. 1) adapted to receive and reform a fuel and to generate a reformate, wherein the first fuel comprises the reformate; wherein the second fuel further comprises a tail gas from said fuel cell module; wherein said combustor is capable of operating in a stand-alone mode; further comprising a steam turbine assembly 150 adapted to receive an exhaust stream from said turbine, to generate steam using the exhaust stream, and to generate power using the steam; wherein said steam turbine assembly comprises: a steam turbine 150 adapted to generate power using the steam; a condenser adapted to receive and condense an exhaust steam from said steam turbine to supply a fluid stream; a pump adapted to receive and pump the fluid stream;

and a heat recovery steam generator 130 adapted to receive the exhaust stream from said turbine, to receive the fluid flow from said pump, and to generate steam from the fluid flow using the exhaust stream. Viteri et al teach various aspects of the claimed invention but do not teach the combustor is a pulse detonation combustor with the air stream nor the stacks in the fuel cell. Bussing '018 teaches the use of a pulse detonation combustor 100 upstream of a turbine 4 where the pulse detonation combustor tubes allow for increases in thermal efficiency and decreased fuel consumption as well as the capability of operating with any fuel, as opposed to conventional combustors (col. 2, lines 42-54). The pulse detonation combustor received air 8 from the compressor. It would have been obvious to one of ordinary skill in the art to employ a pulse detonation combustor with its own a compressed air supply, as taught by Bussing, in place of the conventional combustor of Viteri et al, in order to increase the thermal efficiency and/or reduce fuel consumption as well as allowing the use of any fuel for the pulse detonation combustor. Chandran et al teach using fuel cell stacks is well known and also that the same oxidizer source can be fed to the pulse detonation combustor as well as the reformer, which allows from complete combustion/detonation (col. 18, lines 15+). It would have been obvious to one of ordinary skill in the art to make the fuel cell module with stacks as the conventional practice in the art. It would have been obvious to one of ordinary skill in the art to feed oxidizer to the pulse detonation combustor, as taught by Chandran et al, as being the conventional practice in the art and/or to aid in complete combustion.

As for the combustor and said turbine being sized larger than is required for a nominal, steady operation of said power system, this is within the ordinary skill in the art as being an obvious matter of allowing for extra capacity. It would have been obvious to one of ordinary skill in the art to size the combustor and turbine larger than a nominal value, in order to allow for extra capacity.

Allowable Subject Matter

5. Claims 21, 24, 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Contact Information


Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax numbers for the organization where this application is assigned are

571-273-8300 for Regular faxes and 571-273-8300 for After Final faxes.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Thorpe, can be reached at 571-272-4444.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist of Technology Center 3700, whose telephone number is 703-308-0861. General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at <http://www.uspto.gov/main/patents.htm>

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